

DOCKET NO. NL 000095
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PATENT

IN THE CLAIMS

Please amend the claims as follows.

1. (Currently Amended) A liquid crystal display device, comprising:
a first substrate provided with one or more first electrodes,
a second substrate provided with one or more second electrodes, and
a twisted nematic liquid crystal material between the two substrates, in which, viewed
perpendicularly to the substrates, overlapping parts of the electrodes define pixels,
wherein the display device is provided with means for adjusting an operating voltage of
the liquid crystal display device by:
supplying an input voltage to a measuring element positioned between the first
and second substrates;
measuring a current through the measuring element, the current based on the input
voltage;
determining a derived current using the measured current; and
adjusting the operating voltage using the derived current; and
wherein the means for adjusting are capable of adjusting the operating voltage using the
derived current by:
identifying a maximum value in the derived current; and
identifying a voltage in a sawtooth voltage signal that is coincident with the
maximum value in the derived current, the identified voltage in the sawtooth voltage signal

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comprising the operating voltage of the liquid crystal display device.

2. (Previously Presented) A liquid crystal display device as claimed in claim 1, wherein the means for adjusting the operating voltage of the display device comprise means for measuring a current through the measuring element.

3. (Previously Presented) A liquid crystal display device, comprising:
a first substrate provided with one or more first electrodes;
a second substrate provided with one or more second electrodes; and
a twisted nematic liquid crystal material between the two substrates, in which, viewed perpendicularly to the substrates, overlapping parts of the electrodes define pixels;
wherein the display device is provided with means for adjusting an operating voltage of the liquid crystal display device based on one or more measurements involving a measuring element positioned between the first and second substrates, the means for adjusting the operating voltage of the display device comprising means for raising the operating voltage and simultaneously measuring the current through the measuring element.

4. (Previously Presented) A liquid crystal display device as claimed in claim 2, wherein the means for adjusting the operating voltage of the display device comprise means for raising the operating voltage and measuring a peak current through the measuring element.

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5. (Previously Presented) A liquid crystal display device as claimed in claim 1, wherein the means for adjusting the operating voltage of the display device comprise means for measuring a capacitance of the measuring element.

6. (Previously Presented) A liquid crystal display device as claimed in claim 1, wherein the measuring element comprises a portion of the liquid crystal material.

7. (Previously Presented) A liquid crystal display device, comprising:
a first substrate comprising one or more first electrodes;
a second substrate comprising one or more second electrodes;
a liquid crystal material between the first and second substrates, wherein at least portions of the electrodes that overlap when viewed define pixels;
a measuring element positioned between the first and second substrates; and
a controller operable to adjust an operating voltage of the liquid crystal display device based on one or more measurements involving the measuring element by raising the operating voltage and simultaneously measuring a current through the measuring element.

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8. (Previously Presented) The liquid crystal display device of Claim 7, wherein the one or more measurements measure at least one of:

a current through the measuring element;

a peak current through the measuring element; and

a capacitance of the measuring element.

9. (Previously Presented) A liquid crystal display device, comprising:

a first substrate comprising one or more first electrodes;

a second substrate comprising one or more second electrodes;

a liquid crystal material between the first and second substrates, wherein at least portions of the electrodes that overlap when viewed define pixels;

a measuring element positioned between the first and second substrates; and

a controller operable to adjust an operating voltage of the liquid crystal display device based on one or more measurements involving the measuring element, wherein the controller is operable to adjust the operating voltage of the liquid crystal display device such that a transmission strength of the pixels is fifty percent of a maximum transmission strength.

10. (Previously Presented) The liquid crystal display device of Claim 7, wherein the controller is operable to adjust the operating voltage of the liquid crystal display device at varying ambient temperatures.

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11. (Previously Presented) The liquid crystal display device of Claim 7, wherein the measuring element comprises a portion of the liquid crystal material.

12. (Previously Presented) The liquid crystal display device of Claim 7, further comprising a power supply operable to provide the operating voltage.

13. (Previously Presented) The liquid crystal display device of Claim 7, wherein the liquid crystal material comprises twisted nematic liquid crystal material.

14. (Cancelled).

15. (Previously Presented) The method of Claim 16, wherein the at least one operational characteristic of the measuring element comprises at least one of:

- a current through the measuring element;
- a peak current through the measuring element; and
- a capacitance of the measuring element.

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16. (Previously Presented) A method, comprising:
identifying at least one operational characteristic of a measuring element positioned between a first substrate and a second substrate of a liquid crystal display device; and
adjusting an operating voltage of the liquid crystal display device based on the at least one identified operational characteristic such that a transmission strength of pixels in the liquid crystal display device is fifty percent of a maximum transmission strength.
17. (Previously Presented) The method of Claim 16, wherein adjusting the operating voltage of the liquid crystal display device comprises adjusting the operating voltage at varying ambient temperatures.
18. (Previously Presented) The method of Claim 16, wherein the measuring element comprises a portion of a liquid crystal material between the first and second substrates.
19. (Previously Presented) The method of Claim 16, wherein the liquid crystal material comprises twisted nematic liquid crystal material.

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20. (Currently Amended) A liquid crystal display device, comprising: The liquid crystal display device of Claim 1,

a first substrate provided with one or more first electrodes;

a second substrate provided with one or more second electrodes; and

a twisted nematic liquid crystal material between the two substrates, in which, viewed perpendicularly to the substrates, overlapping parts of the electrodes define pixels;

wherein the display device is provided with means for adjusting an operating voltage of the liquid crystal display device using a derived current associated with a current through a measuring element positioned between the first and second substrates; and

wherein the means for adjusting are capable of adjusting the operating voltage using the derived current by:

identifying a maximum value in the derived current; and

identifying a voltage in a sawtooth voltage signal that is coincident with the maximum value in the derived current, the identified voltage in the sawtooth voltage signal comprising the operating voltage of the liquid crystal display device.

21. (Previously Presented) The liquid crystal display device of Claim 20, wherein:

the input voltage comprises a square-wave voltage signal mixed with a ramp voltage signal to produce a square-wave voltage signal rising in effective value; and

the sawtooth voltage signal is related to the ramp voltage signal.

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22. (New) A liquid crystal display device, comprising:

a first substrate provided with one or more first electrodes;

a second substrate provided with one or more second electrodes;

a twisted nematic liquid crystal material between the two substrates, in which, viewed perpendicularly to the substrates, overlapping parts of the electrodes define pixels; and

an operating voltage adjuster capable of adjusting an operating voltage of the liquid crystal display device using a derived current associated with a current through a measuring element positioned between the first and second substrates, the operating voltage adjuster capable of adjusting the operating voltage using the derived current by:

identifying a maximum value in the derived current; and

identifying a voltage in a sawtooth voltage signal that is coincident with the maximum value in the derived current, the identified voltage in the sawtooth voltage signal comprising the operating voltage of the liquid crystal display device.